DOCUMENT RESUME

ED 062 638 CG 006 797

AUTHOR	Alexrod, Saul; And Others
TITLE	Use of Self-Imposed Contingencies to Reduce the Frequency of Smoking Behavior.
INSTITUTION	Connecticut Univ., Stamford.; Kansas Univ., Lawrence.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	Sep 71
GRANT	OEG-0-9-167016-3573
NOTE	13p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Behavioral Science Research; *Behavior Change; *Negative Reinforcement; *Smoking

ABSTRACT

Two studies were done in which the subjects applied punishment contingencies to themselves for smoking cigarettes. After Baseline in Experiment I, the subject set a limit of 15 cigarettes for himself. If he exceeded the level, he was to tear a dollar bill into pieces for every additional cigarette he smoked. Every five days the criterion was decreased by one cigarette. After 50 days the subject ceased smoking entirely and had not started to smoke again two years after the study was completed. In Experiment II a teacher decreased her smoking rate by contributing 25 cents to charity for each cigarette she smoked and made further gains when she added the condition of not purchasing cigarettes. When Baseline conditions were reinstated, the smoking rate increased, but again diminished when she used a procedure of not buying cigarettes. One year after the study ended she was smoking only in stressful situations. (Author)

FILMED FROM BEST AVAILABLE COPY

ED 062 638

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

USE OF SELF-IMPOSED CONTINGENCIES TO REDUCE THE FREQUENCY OF SMOKING BEHAVIOR

Saul Axelrod

University of Connecticut

and R. Vance Hall, Lynn Weis, and Shelia Rohrer

University of Kansas

CG 006 197

The success of many behavior modification procedures has been dependent on a considerable amount of control over the consequences an individual receives. The settings for such studies have frequently involved classrooms, institutions, or a home environment in which a teacher, ward attendant, or parent can apply contingencies with a considerable amount of freedom. When a behavior problem is exhibited by a noninstitutionalized adult, however, the degree of control that can be exercised over his behavior is often quite limited. In such cases the approach has frequently been to treat the behavior of concern in tightly controlled therapy sessions for a period of time. The intentions of these sessions are that the subject will first cease performing the maladaptive behavior during therapy, and that the effect will later generalize to other parts of the subject's environment in which the therapist does not have control of contingencies. For a behavior such as cigarette smoking, the procedure might involve pairing smoking with an aversive event, such as electric shock (Carlin and Armstrong, 1968), white noise (Greene, 1964), or hot smoke blown in the subject's face (Franks, Fried, and Ashem, 1966). Once this aversive association has been established in the therapy sessions, it is hoped that it will be maintained outside of therapy.

A difficulty that might be encountered with the above procedure is that the associations which are developed in therapy sessions are not always verified by the natural environment. The subject might learn that if he

smokes a cigarette in therapy, he will receive an electric shock, but that when he is outside the therapy sessions, smoking a cigarette does not result in shock. Thus, the aversive associations which an individual has toward smoking might either extinguish or become discriminated.

There is, therefore, a need for developing techniques which affect an individual's behavior when he is in his natural environment. One approach might be to have the contingencies applied by many of the subject's associates. The difficulty of organizing sufficient personnel, however, would often make such a tactic unreasonable. An alternative is to have the procedure constantly acting on the person in such a manner that it does not depend on the actions of a second party. Examples of such a tactic were provided by Azrin, Rubin, O'Brien, Ayllon, and Roll (1966) and by Azrin and Powell (1968) in an approach which was termed "behavioral engineering (Azrin, et al., 1968, p. 100)." The procedure involves using a portable device which detects the undesirable behavior and delivers a stimulus to the individual after the behavior occurs. Behavioral engineering has been effective for decreasing slouching (Azrin, et al., 1968) and for reducing smoking frequency (Azrin and Powell, 1968).

A problem with the behavioral engineering approach is that the devices which are necessary for the detection and consequation of behavior may be difficult or expensive to obtain. Such a limitation is a serious one, if widespread use of behavioral principles is to become a reality. In the two studies which follow, the frequency of cigarette smoking was diminished by using procedures which the individuals applied to their own behavior and which did not necessitate the use of any electrical or mechanical apparatus. In both cases the reliability of smoking frequency was attained by associates of the subject and experimental designs were employed which verified the relationship between the operations and the reduction in smoking.

EXPERIMENT ONE

(Taken from Weis and Hall, 1970)

Subject

The subject, Lynn, who also served as the experimenter, was a 23-year-old graduate student who claimed that he had been smoking 20 to 30 cigarettes a day for approximately two years. He indicated that television commericals aired by the American Cancer Society and the American Heart Association convinced him that he should stop smoking.

Definition of Smoking

Lynn made a tally on a piece of paper he carried with him each time he placed a cigarette in his mouth and lighted it. For recording purposes it did not matter how much of the cigarette was smoked. A record was kept during all of his waking hours (approximately 16 hours a day). On 14 occasions reliability checks were made by Lynn's classmates, parents, or girl friend. In each instance reliability was 100%.

- - - - - - - - - - - - -

Insert Fig. 1 about here

- - - - - - - - - - - - -

Experimental Phases and Results

Baseline. The number of cigarettes Lynn smoked before experimental procedures were implemented was tallied for a 17 day Baseline period. Figure 1 indicates that during this phase he smoked 16.6 cigarettes a day. From Days 8 to 13 Lynn also smoked a pipe. The pipe smoking which is not included in the data, may have produced some decrease in cigarette smoking. During the final four days of Baseline (Days 14 to 17) he smoked 16 cigarettes each day.

Tearing Up a Dollar Bill for Excessive Smoking. Beginning with Day 18 Lynn imposed a response-cost procedure (Weiner, 1962) on himself in which he was required to tear a dollar bill into small pieces each time he smoked

(Lynn)

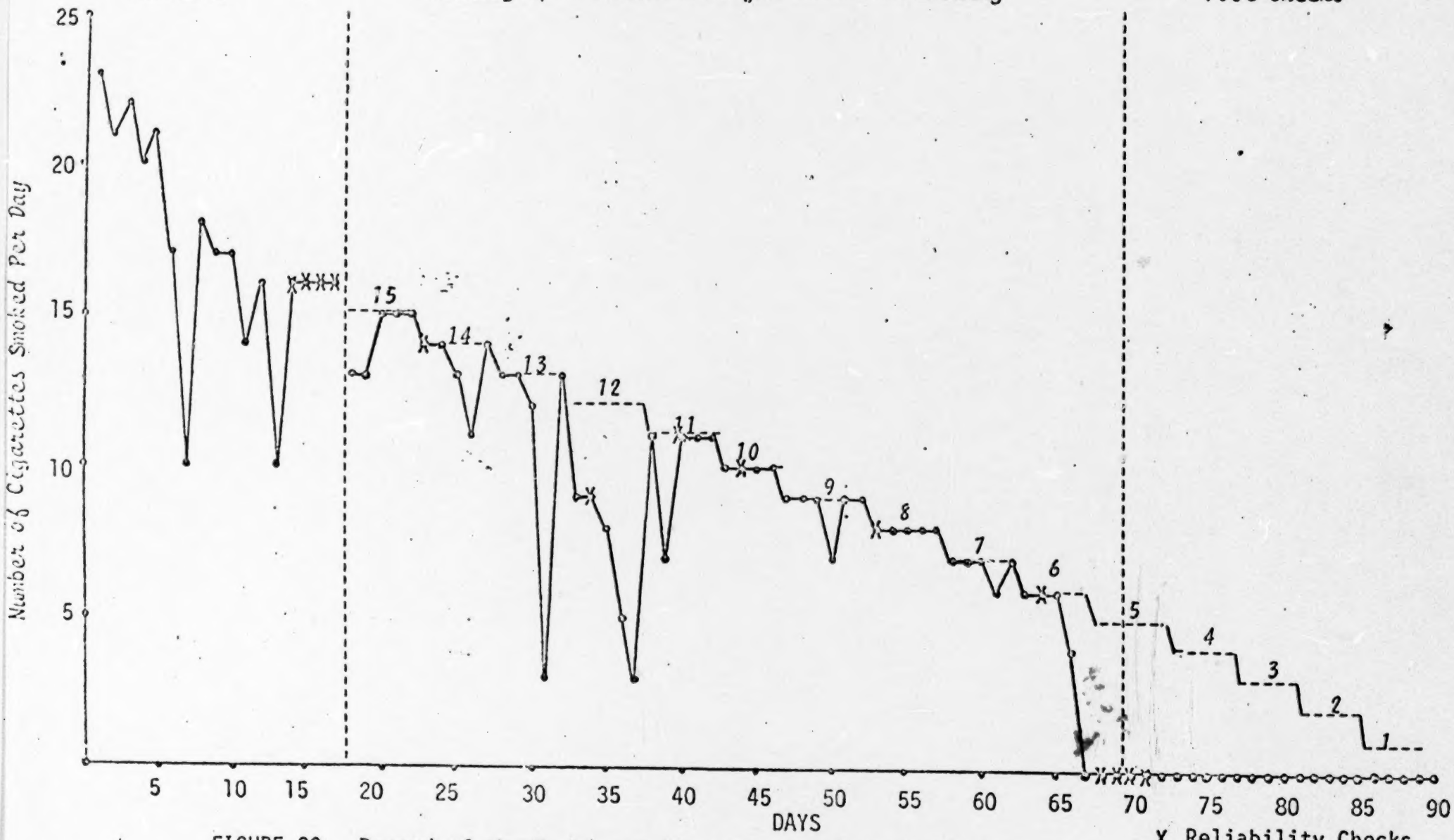


FIGURE 20. Record of the Number of Cigarettes Smoked Per Day by a Graduate Student.

more than 15 cigarettes a day. The contingency was such that one dollar was to be ripped for each cigarette that exceeded the limit. The 15 cigarette criterion was in effect for five days, and then was lowered to 14 cigarettes for five days, then to 13, to 12, and so on, until the criterion ceiling became 0. Figure 1 indicates that the subject never exceeded the maximum line criterion. After the response-cost contingency was in effect for 50 days Lynn ceased smoking entirely. This observation was verified both during a Post Checks period, in which the response-cost procedure was employed, and two years after the study was terminated and was corroborated by Lynn's friends.

EXPERIMENT TWO

Subject

The subject, Shelia, was a 37 year old learning disabilities teacher who also served as the experimenter. She had been smoking for 20 years before the study began and had previously made several unsuccessful efforts to stop smoking. She estimated that she had averaged 15 cigarettes a day before the study began.

Measurement of Behavior

Shelia obtained a record of the number of cigarettes she smoked by either counting the number of cigarettes in a package at the beginning and end of a day, or by noting the number of cigarettes in an ashtray which was empty before she began to smoke. On 14 occassions associates performed reliability checks and in each instance there was 100% agreement in their records.

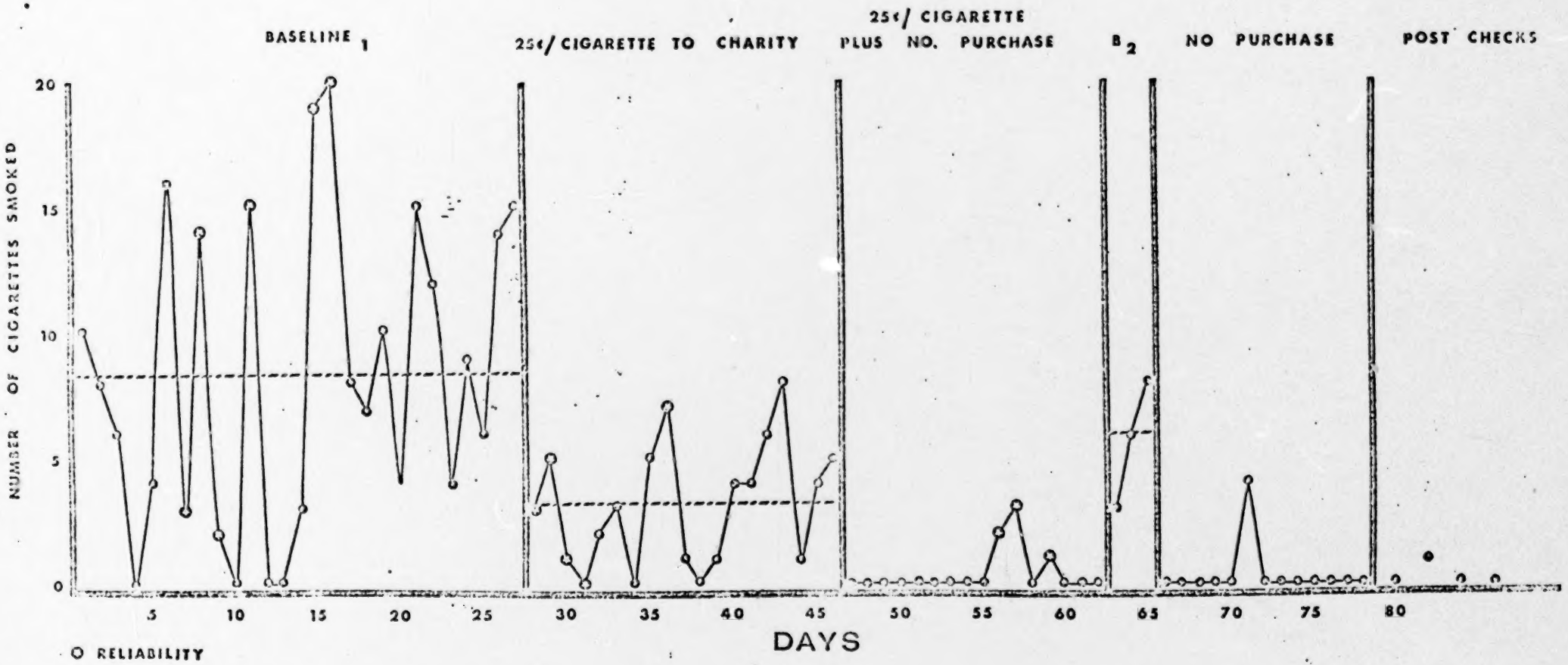
Experimental Phases and Results

Baseline$_1$. Shelia obtained a record of the number of cigarettes she smoked for a 27 day period in which no contingencies were applied to her behavior. Figure 2 indicates that during the Baseline$_1$ stage, she smoked an average of 8.4 cigarettes a day, with a range of 0 to 20.

Twenty-five cents per cigarette to charity. In the second stage of the

---

Insert Figure 2 about here


BASELINE 1
25¢/ CIGARETTE TO CHARITY
25¢/ CIGARETTE PLUS NO. PURCHASE
B 2
NO PURCHASE
POST CHECKS
NUMBER OF CIGARETTES SMOKED
20
15
10
5
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
DAYS
O RELIABILITY

study Shelia continued to contribute 25 cents to charity for each cigarette she smoked and added the procedure of not purchasing cigarettes. In order to smoke it was therefore necessary for her to "bum" cigarettes from her associates. During the 16 days in which these procedures were in effect, she smoked no cigarettes on 13 occasions and averaged 0.37 cigarettes for the entire stage.

Baseline$_2$. For three days Baseline$_1$ conditions were reinstated. During this period Shelia allowed herself to purchase cigarettes and did not contribute to charity after smoking a cigarette. The mean for the phase was 6.0 cigarettes a day.

Not purchasing cigarettes. In the fifth stage of the experiment she used the previous procedure of not buying cigarettes, but did not contribute to her favorite charity after smoking. Under these conditions Shelia smoked no cigarettes on 12 days and five cigarettes during one day.

Post checks. In the final stage of the study measurements were conducted periodically, but the procedure of not buying cigarettes was still applied. During the four days in which post checks were made, Shelia smoked a total of only one cigarette.

One year after the study was formally terminated, Shelia indicated that she was smoking only in "stressful" situations, such as the beginning of the school term and during University examinations. Unfortunately, she did not have data to indicate the frequency of her latest smoking behavior.

DISCUSSION

In both of the above studies, procedures were employed which could be applied to noninstitutionalized adults without using expensive apparatus or therapy sessions. It was unnecessary to use second parties to implement the contingencies, although associates of the subjects were needed to perform reliability checks. Whereas other smoking studies have been concerned about generalization from the therapy environment to the natural environment,

such a consideration was irrelevant in the present cases since the therapy and natural environments were identical.

It should be noted that in both experiments the subject's estimate of the number of cigarettes he smoked was greater than that which was actually recorded during the initial baseline phase. A possible explanation for this finding is that by simply recording a certain behavior, an improvement sometimes occurs. The feasibility of such an interpretation was demonstrated in classroom experiment by Broden, Hall, and Mitts (1970) in which the study behavior of two children improved when self-recording techniques were instituted.

It is difficult to state why Lynn, the subject in Experiment 1, has not smoked since the study ended, but, Shelia, the subject in Experiment 2, has exhibited some return to her former smoking behavior. Until the problem is solved, perhaps the best means of proceeding is to devise techniques which are sufficiently simple that when reinstitution of the procedures becomes necessary, implementation can be achieved with a minimal amount of difficulty. Both procedures in this report satisfy this criterion. In fact, Shelia has indicated that she will reapply the experimental procedures if she decides that smoking has again become a problem for her.

The experimental design used in the first study provides an alternative to the reversal and multiple-baseline procedures used in most behavior modification investigations. (Baer, Wolf, and Risely, 1968, give a thorough description of these designs.) The design which the authors have termed the changing-criterion design, consists of comparing a changing criterion for administering a consequence with the actual performance of the subject. When the correspondence between the two is high, one can have confidence that the criterion and its associated consequence are controlling the subject's behavior. In Experiment 1 it was found that Lynn exactly matched

the maximum line criterion on 33 occasions out of 50 days between the time the 15 cigarette criterion was used and the time the 6 cigarette maximum was employed. In addition, the correlation between the criterion ceiling and the number of cigarettes the subject smoked was $r=0.73$ ($p < .001$), indicating that as the criterion changed, there was a strong tendency for the smoking frequency to change in the same direction. (See Hall, Fox, Weis, and Quinn for more details on the changing criterion design.)

Baer, et al. (1968) pointed out the importance of inter-subject reliability on the behavior of interest when instrumented recording is not possible; Simkins (1971) emphasized the importance of such procedures for self-recorded behaviors. The present authors would like to suggest another type of reliability when an individual applies consequences to his own behavior. The procedure, termed reliability of operations, refers to determining the degree to which the subject actually carries out the contract which he made with himself. Such a tactic is desirable since an individual might record his behavior accurately, but fail to apply a consequence to himself, particularly when aversive conditioning is involved. Thus, in Experiment 2 Shelia could fail to contribute 25 cents to charity for some of the cigarettes she smoked. Although a few violations of the contract might not affect the results, information on the degree to which the subject actually carried out the operations might be useful.

References

Azrin, N.H., and Powell, J. Behavioral engineering: The reduction of smoking behavior by a conditioning apparatus and procedure. Journal of Applied Behavior Analysis, 1968, 1, 193-200.

Azrin, N., Rubin, H., O'Brien, F., Ayllon, T., and Roll, D. Behavioral engineering: postural control by a portable operant apparatus. Journal of Applied Behavior Analysis, 1968, 1, 99-108.

Baer, D.M., Wolf, M.M., and Risely, T.R. Some current dimensions of applied behavior analysis. Journal of Applied Behavior Analysis, 1968, 1, 91-97.

Broden, M., Hall. R.V., and Mitts, B. The effect of self-recording on the classroom behavior of two eighth-grade students. Paper presented at the University of Kansas Symposium on Applied Behavior Analysis in Education, 1970, Lawrence, Knasas.

Carlin, A.S., and Armstrong, H.E. Aversive conditioning: Learning or dissonance reduction. Journal of Consulting and Clinical Psychology, 1968, 32, 674-678.

Franks, C.M., Fried, R., and Ashem,B. An improved apparatus for the aversive conditioning of cigarette smokers. Behavior Research and Therapy, 1966, 4, 301-308.

Greene, R.J. Modification of smoking behavior by free operant conditioning methods. Psychological Record, 1964, 14, 171-178.

Hall, R.V., Fox, R., Weis,L., and Quinn, A. Shaping: Three studies using changing criterion research designs. Submitted for publication.

Simkins, L. The Reliability of self-recorded behaviors. Behavior Therapy, 1971, 2, 83-87.

Weiner, H. Some effects of response cost upon human operant behavior. Journal of the Experimental Analysis of Behavior, 1962, 5, 201-208.

Weis, L. and Hall, R.V. Modification of cigarette smoking through avoidance of punishment. In R.V. Hall(Ed.), Managing behavior: Part III. Merriam, Kansas, 1970, 54-55.

Footnote

[1]This research was supported in part by the National Institute of Child Health and Human Development (HD-03144, Bureau of Child Research and Department of Human Development and Family Life, University of Kansas) and by the U.S. Office of Education (OEG-0-9-167016-3573, University of Connecticut). Reprints may be obtained from R. Vance Hall, Juniper Gardens Children's Project, 2021 North Third Street, Kansas City, Kansas 66101.

Figure Captions

Fig. 1 Record of the number of cigarettes smoked per day by a graduate student.

Fig. 2 The number of cigarettes a teacher smoked each day during the following stages: Baseline$_1$ - a period in which no contingencies were applied to smoking; 25¢/Cigarette to Charity - the subject donated 25 cents to charity for each cigarette she smoked; 25¢/Cigarette to Charity Plus No Purchase - the procedure of not buying cigarettes was added to the charity contingency; Baseline$_2$ - a reinstatement of Baseline$_1$ conditions; No Purchase - a phase in which the subject did not purchase cigarettes; and Post Checks - periodic checks on smoking behavior when the practice of not purchasing cigarettes was still in effect.